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LISTING OF CLAIMS

1 (currently amended). A sensor for detecting and/or imaging and/or identifying a component of chemical and/or biological samples contained in or containing fluids, which comprises:

an array of impedance electrode elements;

a fluid-impervious layer separating said elements from said samples so as to prevent electrode fouling and having an inner surface facing said elements and an outer surface on which said samples are placed; and

means for applying electrical interrogating signals to said elements, measuring impedance signals which are generated by said interrogating signals, and converting the resulting signals into ~~visual images~~ impedance patterns.

2 (previously presented). The sensor of claim ~~1~~30, wherein said array is comprised of many tiny capacitive electrode pairs, each pair disposed as a tiny two-dimensional pixel, so as to form a two-dimensional imaging lattice.

3 (previously presented). The sensor of claim 2, wherein said fluid-impervious layer comprises phosphosilicate glass, silicon nitride, silicon carbide, or a polymeric material, such as polyethylene, polypropylene, polytetrafluoroethylene, polymethacrylate or polycarbonate.

4 (previously presented). The sensor of claim 2, wherein a test sample can come in contact only with glass or derivatized glass, which causes no contamination of the sample, and whose effect on the sample is minimal.

5 (previously presented). The sensor of claim 1, wherein said outer surface is amenable to the ~~chemical~~ attachment of active elements that can interact with ~~chemical or biological molecules and/or particles~~said component.

6 (previously presented). The sensor of claim 5, wherein said surface is treated so as to effectuate selective binding to said surface of specific molecular species or of specific biological particles.

7 (previously presented). The sensor of claim 6, wherein said treated surface permits ~~antibody~~ binding of said component to be observed as it occurs.

8 (previously presented). The sensor of claim 2, wherein said two-dimensional pixels are small enough to permit detection and imaging of single cells, bioparticles, DNA fragments, and molecular specific events.

9 (previously presented). The sensor of claim ~~1~~30, wherein said signals converting means is capable of acquiring two or more channels of information at one time.

10 (previously presented). The sensor of claim 1, wherein said signals converting means is capable of following changes in said samples so as to perform biochemical or biological imaging in vivo on living tissue or on living cells.

11 (previously presented). The sensor of claim 1, wherein said electrical interrogating, signals measuring, and signals converting means utilizes a selected alternating frequency for the interrogating signals and is able to interpret impedance changes in terms of molecular or cellular parameters.

12 (previously presented). The sensor of claim 1, wherein said signals converting means is able to effectuate quantitative measurements of ions in immediate proximity to cell membranes.

13 (previously presented). The sensor of claim 10, wherein said signals converting means comprises means for monitoring metabolic changes in real time or the progress of cryosurgery.

14 (previously presented). The sensor of claim ~~1~~30, wherein said signals converting means comprises means for diagnosing any occurrence of cancer or of bacterial contamination by comparing observed images with a library of cancerous cell shapes or of pathogen cell shapes.

15 (currently amended). A method of <u>detecting and/or</u> imaging <u>and/or identifying a component of</u> chemical and/or biochemical samples which comprises the steps of:

placing said samples adjacent to a fluid-impervious layer which separates them from an array of capacitive electrode elements;

applying electrical interrogating signals to said elements;

converting the resulting signals into impedance patterns~~visual images~~.

16 (previously presented). The method of claim 15, comprising a preliminary step of pre-treating the surface of said layer so as to effectuate selective binding to said surface of specific molecular species or of specific biological particles.

17 (previously presented). The method of claim 16, comprising the further step of interpreting said impedance signals so as to observe molecular or cellular parameters, such as the toxins, cell lines, bio-fouling or bio-materials buildup, viability or metabolic changes.

18 (previously presented). The method of claim 16, wherein said pre-treating step comprises derivatizing said surface to isolate specific molecular species.

19 (previously presented). The method of claim 18, wherein said pre-treating step comprises coating said surface with a reactive compound to enable selective gas or vapor sensing.

20 (previously presented). The method of claim 16, wherein said pre-treating step comprises selective derivatization of said surface allowing only selected biological particles, such as cells, spores, pollen grains or other specific cell lines, to attach thereto, and wherein said interpreting step comprises monitoring the size, shape, viability, type, or status of the attached biological particles.

21 (previously presented). The method of claim 20, wherein said pre-treating step comprises chemical derivatization of said surface and induction of selectivity by covalent binding of antibodies or oligonucleotides.

22 (previously presented). The method of claim 17, wherein said interpreting step comprises monitoring metabolic changes in real time or the progress of cryosurgery.

23 (previously presented). The method of claim 17, wherein said interpreting step comprises comparing observed images with a library of cancer cell shapes so as to diagnose any occurrence of cancer.

24 (previously presented). The method of claim 17, wherein said interpreting step comprises comparing observed images with a library of pathogen cell shapes so as to diagnose any occurrence of bacterial contamination.

25 (previously presented). The method of claim 21 which comprises generating two or more derivatized surface patterns, each pattern corresponding to a different analyte. and programming the sequence of interrogating signals so as to generate a separate image of each of said patterns.

26 (previously presented). The method of claim 19, wherein said gas or vapor is or originates from a hazardous or illicit substance, such as a chemical warfare agent, a carcinogenic or otherwise toxic industrial emissions product, an explosive compound, or a narcotic.

27 (previously presented). The sensor of claim 12, wherein said signals converting means is able to effectuate selective detection and measurements of specific molecular species.

28 (previously presented). The sensor of claim 27, wherein said species is absorbed or adsorbed from a gaseous phase.

29 (previously presented). The sensor of claim 28, wherein said species is or originates from a hazardous or illicit substance, such as a chemical warfare agent, a carcinogenic or otherwise toxic industrial emissions product, an explosive compound, or a narcotic.

30 (new). The sensor of claim 1, wherein said impedance patterns are converted into visual images.

31 (new). The method of claim 15, wherein said impedance patterns are converted into visual images.

Respectfully submitted by,

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CERTIFICATION OF FAXING

The undersigned hereby certifies that this response is about to be transmitted to fax number 703-872-9306 on or about April 15, 2004.

Solomon Zaromb